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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Project | Date | Author

JMM MLL KAS JEP GRS N&M ASW JWB RCH JGY STC ESS

SUBJECT—

TITLE

PRELIMINARY RESULTS OF RISK RATING ALL CONIFEROUS TREE SPECIES ON THE HAT CREEK STUDY PLOTS

By
R. C. Hall
Berkeley, California
July 14, 1942

INDEX NO.—

U.S. GOVERNMENT PRINTING OFFICE 8—9742

Forest Insect Laboratory
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APPROVED BY:

J. M. MILLER
Senior Entomologist, In Charge

SUBMITTED BY:

R. C. Hall
Associate Entomologist

Copies to:
Craighead
Keen
Evenden
7/22/42

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PRELIMINARY RESULTS OF RISK RATING ALL CONIFEROUS TREE SPECIES ON THE HAT CREEK STUDY PLOTS

One phase of the general ecological study of the western pine beetle problem at the Hat Creek Field Laboratory has been the establishment of a series of 38, 20-acre permanent study plots. The main purpose of these plots is to study the effect of climate and other ecological factors on the behavior of the western pine beetle and other tree killing insects associated with it. One of the steps in the establishment of these plots has been a stand inventory and a risk classification of ponderosa pine, following the general principals established by Salman (3) and, Bongberg (1) and Johnson (2).

These plots were established in essentially a random fashion proportionally according to insect hazard zones as established by Johnson for the area. These plots sample practically all forest type and hazard zones common to the eastside subregion.

The boundaries of these plots were established in 1938, 1939, and 1940 and insect loss cruiees have been conducted for a period of three years. Records of losses of all species on these plots for 1939 indicated that the trees being killed were predominately decadent, irrespective of the tree species. Therefore it was decided to risk rate all coniferous species on these plots when they were inventoried. This was done on a general appearance basis with four classes of risk recognized similar to that applied to ponderosa pine. This inventory work, except for a few plots, was completed late in 1940. An analysis of the loss data for 1941 has been completed with the following results.

Stand Composition on the Plots

Table 1 presents data on the stand composition of these plots. A total of 20,837 trees have been risk rated. These are made up of the following species: ponderosa pine, 10,450; white fir, 4,427; incense cedar, 2,583; Jeffrey pine, 2,026; sugar pine, 901; and Douglas fir, 450. The 424 oaks were not rated. All trees which were rated were marked on the bark by a scribe or paint spots to indicate the class to which they were assigned.

Table 1.-- A Summary of Tree Species on 38, 20-Acre Sample Plots.

Species	No. Trees	No. Plots Containing Each Species
Ponderosa Pine	10,450	37
White Fir	4,427	26
Incense Cedar	2,583	25
Jeffrey Pine	2,026	13
Sugar Pine	901	25
Douglas Fir	450	11
Oaks *	424	7
Total	21,261	38

* The Oaks were not risk rated

Loss for 1941

There was a total of 78 trees destroyed by insects in 1941. These occurred by species as follows: ponderosa pine, 49; white fir, 20; Jeffrey pine, 6; and sugar pine, 3. No loss occurred in incense cedar and Douglas fir.

Results of the First Year After Rating

Table 2 presents the results of the first year of records following risk rating of all species. These data are too meagre to be conclusive and must be considered only as preliminary evidence of the success of such rating. Particularly weak are the data on sugar pine and Jeffrey pine where only 3 and 6 trees respectively occur in the loss. These preliminary data indicate the following score, by species.

Ponderosa Pine.-- Seventy-three and three tenths percent of the volume loss occurred in risk IV, 10.7 percent in risk III, 7.8 percent and 7.7 percent in risk II and I respectively, the latter two occurring as part of a larger group, and 1.5 percent in risk I

Table 2.-- Results of Risk Rating all Coniferous Tree Species on the 38, 20-Acre Study Plots.

Insect Loss figures are for the 1941 season.

Number of trees and Volume

Risk Rating	Ponderosa Pine		Jeffrey Pine		White Fir		Sugar Pine	
	Vol.	No. trees	Vol.	No. trees	Vol.	No. trees	Vol.	No. trees
IV	26,930	29	4,910	2	16,130	16	17,920	3
III	3,970	10	3,200	1	1,690	3		
II G*	2,900	6						
I G*	2,900	3						
II S*	570	1	3,400	3	100	1		
Total	37,270	49	11,520	6	17,920	20	17,920	3

Percent Number of trees and Volume

Risk Rating	Ponderosa Pine		Jeffrey Pine		White Fir		Sugar Pine	
	% Volume	% No. trees	% Volume	% No. trees	% Volume	% No. trees	% Volume	% No. trees
IV	72.3	59.2	42.6	33.3	90.0	80.0	100.0	100.0
III	10.7	20.4	27.8	16.7	9.4	15.0		
II G*	7.8	12.3						
I G*	7.7	6.1						
II S*	1.5	2.0	29.6	50.0	0.6	5.0		
III and IV	83.0	79.6	70.4	50.0	99.4	95.0	100.0	100.0
I and II	17.0	20.4	29.6	50.0	0.6	5.0	0	0

G* include trees in groups
S* include trees occurring singly

occurring as single trees. By high and low risk the score was 83.0 percent in high and 17.0 percent in low. The basis here was 49 trees.

Jeffrey Pine.-- The score for Jeffrey pine was the poorest for all species with 42.6 percent in IV, 27.8 percent in III, and 29.6 percent in II; by high and low it was 70.4 percent in high and 29.6 percent in low. The basis here was 6 trees.

White Fir.-- The score for white fir was second best for all species with 90 percent occurring in IV, 9.4 percent in III and 0.6 percent in II; by high and low risk it was 99.4 percent in high and 0.6 percent in low. The basis here was 20 trees.

Sugar Pine.-- The sugar pine score was the best of all species rated, but as the basis is only 3 trees the element of chance is too great to give this much significance. Of the trees which died all had previously been rated as risk IV.

Conclusions

These preliminary results of risk rating all coniferous species on the basis of general appearance seems to indicate that it may be possible to predict loss in all coniferous species in the eastside subregion. It seems to fufther indicate that the factors contributing to decadence which makes a tree more susceptible to insect attack may be common to all species and that the factor may be associated with climate.

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